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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/618,049	07/11/2003	Peter Mardilovich	200300109-1	5611

22879 7590 08/16/2006

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EXAMINER

BAREFORD, KATHERINE A

ART UNIT PAPER NUMBER

1762

DATE MAILED: 08/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/618,049

Applicant(s)

MARDILOVICH ET AL.

Examiner

Katherine A. Bareford

Art Unit

1762

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 June 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) 21-30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. The Response and 37 CFR 1.131 declaration filed on June 21, 2006 have been received and entered. With the response, claims 1-20 remain pending for examination and claims 21-30 remain withdrawn from consideration.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-4, 6, 8-9 and 13-14^{and 18} are rejected under 35 U.S.C. 102(b) as being anticipated by Svedberg et al (US 6194032).

Svedberg teaches a method of forming metal patterns on a substrate. Column 3, lines 50-65. An "electroless active layer" is formed on the substrate (the catalytic layer). Column 10, lines 45-55. A pattern is decided for application. column 6, lines 30-40. A composition is ink-jetted in the pattern. Column 6, lines 30-40. The composition can include a metal composition that includes a metal salt and a reducing agent composition with a reducing agent. Column 6, lines 45-55 and column 7, lines 15-50. The reducing agent contacts the metal composition and reacts with the metal salt to

form a reduced metal. Column 6, lines 35-40 (note that as worded, the claim does not require that the two compositions be applied separately or from separate sources).

Claim 2: the metal can be palladium, gold, etc. Column 7, lines 25-30.

Claim 3: the metal composition can include a metal salt of palladium. Column 7, lines 25-30.

Claim 4: the salt can be $\text{KAu}(\text{CN})_2$ or $\text{NaAu}(\text{S}_2\text{O}_3)_2$. Column 15, lines 1-5 and 35-40 and column 7, lines 35-40.

Claim 6: the reducing agent can include dimethyaminoborane. Column 7, lines 40-45.

Claim 8: the substrate can be ceramic. Column 6, lines 1-10.

Claim 9: the compositions are heated on the pattern to 82 degrees C, for example. Column 14, lines 30-40.

Claim 13: the active layer is formed by depositing an electroless initiator on the substrate. Column 10, lines 45-55.

Claim 14: the initiator can include palladium. Column 10, lines 45-55.

Claim 18: the initiator can be deposited in a non-continuous pattern. Column 10, lines 50-55 (selectively exposing).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 10, 11, 16, 17 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Svedberg et al (US 6194032).

Svedberg teaches all the features of these claims, as discussed in the 35 USC 102(b) rejection above, except (1) the multiple layers of printing (claim 10), (2) the depositing of the initiator by ink jetting (claim 16), (3) the depositing the initiator by immersion (claim 17) and (4) the pattern being a circuit (claim 20).

Svedberg does teach that when applying the patterned material, it may be necessary to repeat the applicator process multiple times to get the desired depth. Column 17, lines 55-60. The desired depth can be 50 to 500 microns. Column 11, lines 10-20. The initiator is applied by exposing the substrate to activating solution, which

can be selectively exposed. Column 10, lines 45-55. Svedberg teaches that it can be desired to provide functional films in micro-electronics. Column 1, lines 20-25.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Svedberg to provide multiple layers of ink-jet printing to get the final desired coating depth, which can be 50-100 microns deep in order to provide a desirably thick coating pattern, because Svedberg teaches to provide ink-jet printing as one of the application methods and that the application method may have to be repeated to get the desired depth, which can be 50 to 100 microns in depth. It further would have been obvious to modify Svedberg to apply the initiator by ink jetting as well in order to provide a desirably patterned initiator, since this is shown to be a known method of selective application and Svedberg teaches that the initiator can be selectively applied. It further would have been obvious to modify Svedberg to apply the initiator by immersion with an expectation of desirable coating results, because it is the Examiner's position that it is well known in the art of electroless plating to apply the initiator by immersion. It further would have been obvious to modify Svedberg to apply the pattern as a circuit pattern with an expectation of desirable coating results, because Svedberg teaches that a type of film that it is desired to apply are functional films in micro-electronics, and it is the Examiner's position that a well known functional film in the micro-electronic area is a circuit pattern.

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Svedberg as applied to claims 1-4, 6, 8-9 and 13-14 above, and further in view of Japan 08-319575 (hereinafter '575).

Svedberg teaches all the features of this claim except what palladium salt can be used.

However, '575 teaches that $\text{Pd}(\text{NH}_3)_4\text{Cl}_2$ can be used as the metal salt for an electroless deposition. Abstract.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Svedberg to use $\text{Pd}(\text{NH}_3)_4\text{Cl}_2$ as the palladium salt when depositing palladium as suggested by '575 in order to provide a desirable palladium coating, because Svedberg teaches that palladium can be deposited electrolessly and '575 teaches that $\text{Pd}(\text{NH}_3)_4\text{Cl}_2$ is a desirable metal salt for electrolessly depositing palladium.

8. Claims 7 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Svedberg as applied to claims 1-4, 6, 8-9 and 13-14 above, and further in view of McCormack et al (US 4301196).

Svedberg teaches all the features of this claim except the reducing agent (claim 7) and the initiator of palladium and tin (claim 15).

However, McCormack teaches an electroless deposition process. Column 3, lines 60-68. The reducing agent can be various materials including boranes and hydrazines.

Column 5, lines 40-50. The surfaces in be activated with an initiator that uses palladium and tin. Column 6, lines 50-65.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Svedberg to hydrazine as a reducing agent and palladium and tin as an initiator as suggested by McCormack in order to provide a desirable electroless coating, because Svedberg teaches to use various known reducing agents and that the surface can be activated with a palladium initiator in an electroless coating process and McCormack teaches that a desirable reducing agent for electroless plating is hydrazine and a desirable initiator for electroless plating is palladium and tin.

9. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Svedberg as applied to claims 1-4, 6, 8-9 and 13-14 above, and further in view of Wells (US 3918927).

Svedberg teaches all the features of this claim except the marring of the substrate.

However, Wells teaches that the application of activator solution of palladium chloride is performed in acidic environments. Column 11, lines 54-57.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Svedberg ^{to} mar the substrate by etching from acid as suggested by Wells in order to provide a desirable electroless coating, because Svedberg teaches that an initiator coating with palladium can be applied and Wells teaches that

when applying such a coating it is known to provide it in an acid environment which would further provide marring by etching from the acid.

10. Claims 1-4, 6-18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jacobson (US 6120588) in view of McCormack (US 4301196).

Jacobson teaches a method of forming metal patterns on a substrate. Column 9, lines 15-30. A pattern is decided for application. Column 9, lines 15-30. A metal composition is ink-jetted in the pattern. Figure 9A and column 9, line 60 through column 10, line 10 (the silver nitrate). A separate reducing agent composition with a reducing agent is also ink jetted in the pattern. Figure 9A and column 9, line 60 through column 10, line 10 (the aldehyde). The reducing agent contacts the metal composition and reacts with the metal salt to form a reduced metal. Figure 9A and column 9, line 60 through column 10, line 10 (by the process of "electroless plating"). While Jacobson describes silver nitrate plating, the reference teaches that many other chemistries known in the art of electroless plating can be used. Column 10, lines 1-5.

Claim 2: the metal can be silver, etc. Figure 9A and column 9, line 60 through column 10, line 10 (the silver nitrate).

Claim 3: the salt can be AgNO_3 . Column 10, line 1.

Claim 6: the reducing agent can include aldehyde. Figure 9A and column 9, line 60 through column 10, line 10 (the aldehyde).

Claim 12: the reducing agent is ink jetted on the pattern in a offset area with respect to the metal composition. Figure 9A. A portion of each material would not overlap each other due to the offset nature of their sprays.

Jacobson teaches all the features of these claims except (1) the electroless active layer (claim 1), (2) the specific reducing agent (claims 6-7), (3) the specific substrate (claim 8), (4) the heating (claim 9), (5) the multiple layers and depth (claims 10-11), (6) the initiator features (claims 13-18) and (7) the circuit pattern (claim 20).

However, McCormack teaches a method of applying an electroless copper plating. Column 3, lines 60-68. The surface can be pretreated with an initiator treatment, such as by depositing an electroless initiator of palladium and tin. Column 6, line 50 through column 7, line 5. The pretreatment can be immersed the initiator. Column 7, lines 1-5. The plating can use a reducing agent of formaldehyde or hydrazines. Column 5, lines 40-50. The substrate can be ceramics, glass, polymers, etc. column 7, lines 30-35. During treating the temperature can be 20-80 degrees C. Column 7, lines 20-30. The coating is to be applied until a desired thickness has been built up. Column 7, lines 5-10. McCormack teaches that the plating can be used to apply circuit patterns. Column 1, lines 25-50.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Jacobson to use the conventional electroless plating features taught by McCormack in the inkjet electroless plating process with an expectation of a desirable plated article being achieved, because Jacobson teaches a

method of inkjet electroless plating that can be used with conventional electroless plating chemistry and McCormack teaches conventional electroless plating chemistry, including the use of an initiator layer of electroless active material, conventional reducing agents such as hydrazines, specific substrate materials, such as ceramics, the conventional heating of the compositions during application, the conventional materials and application of the initiator layer and the conventional deposition of the material to form circuit patterns. As to the multiple applications to form layers of the desired depth, it would have been obvious to one of ordinary skill in the art to do so, given McCormacks teaching to provide the treatment until the desired depth has been reached, and one of ordinary skill in the art would optimize the depth based on the desired purpose of the coating to be applied. It further would have been obvious to deposit the initiator by ink jetting in a non-continuous pattern to correspond to the metal pattern to be applied so that the minimum amount of material can be used.

11. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jacobson in view of McCormack as applied to claims 1-4, 6-18 and 20 above, and further in view of Japan 08-319575 (hereinafter '575).

Jacobson in view of McCormack teaches all the features of this claim except what palladium salt can be used.

However, '575 teaches that $\text{Pd}(\text{NH}_3)_4\text{Cl}_2$ can be used as the metal salt for an electroless deposition. Abstract.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Jacobson in view of McCormack to use $\text{Pd}(\text{NH}_3)_4\text{Cl}_2$ as the palladium salt when depositing palladium as suggested by '575 in order to provide a desirable palladium coating, because Jacobson in view of McCormack teaches electroless coating using conventional materials and '575 teaches that $\text{Pd}(\text{NH}_3)_4\text{Cl}_2$ is a desirable metal salt for electrolessly depositing palladium.

12. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jacobson in view of McCormack as applied to claims 1-4, 6-18 and 20 above, and further in view of Wells (US 3918927).

Jacobson in view of McCormack teaches all the features of this claim except the marring of the substrate.

However, Wells teaches that the application of activator solution of palladium chloride is performed in acidic environments. Column 11, lines 54-57.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Jacobson in view of McCormack ^{to} _Λ mar the substrate by etching from acid as suggested by Wells in order to provide a desirable electroless coating, because Jacobson in view of McCormack teaches that an initiator coating with palladium can be applied and Wells teaches that when applying such a coating it is known to provide it in an acid environment which would further provide marring by etching from the acid.

Response to Amendment

13. The declaration filed on June 21, 2006 under 37 CFR 1.131 is sufficient to overcome the Johnson et al (US 2005/0174407) reference.

Response to Arguments

14. Applicant's arguments with respect to claims 1-20 have been considered but are moot in view of the new ground(s) of rejection.

The rejections under 35 USC 103 using Johnson have been withdrawn due to applicants 37 CFR 1.131 declaration. However, the above rejections using Svedberg and Jacobson in view of McCormack have been used to now reject the claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katherine A. Bareford whose telephone number is (571) 272-1413. The examiner can normally be reached on M-F(6:00-3:30) with the First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone numbers for the organization where this application or proceeding is assigned are (571) 273-8300 for regular communications and for After Final communications.

Other inquiries can be directed to the Tech Center 1700 telephone number at (571) 272-1700.

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Furthermore, information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


KATHERINE BAREFORD
PRIMARY EXAMINER